Corres. and Mail
BOX AF

Docket No. 57357-015

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	: **RESPONSE UNDER 37 CFR 1.116**
	: **EXPEDITED PROCEDURE**
Boris MASLOV, et al.	: Customer Number: 20277
	:
Serial No.: 09/826,422	: Confirmation Number: 3821
	:
Filed: April 05, 2001	: Group Art Unit: 2834
	: Examiner: H.N. Nguyen

For: ROTARY ELECTRIC MOTOR HAVING CONCENTRIC ANNULAR MEMBERS

REPLY BRIEF

Mail Stop Reply Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Reply Brief is filed under 37 CFR 1.193(b)(1) in response to the Examiner's Answer (hereinafter "Answer"), dated October 3, 2003. Claims 1 through 6 and 11 through 16 remain on appeal. Appellant maintains the position that these claims stand improperly rejected and reasserts all arguments contained in the Principal Brief. Reference is made herein to the Principal Brief for its descriptions of the applied references and arguments advanced for patentability. The following commentary focuses on portions of the Examiner's Answer that are believed to warrant additional clarification of Appellant's position.

Paragraph 5 (page 2) of the Answer takes issue with the summary of invention portion of the Principal Brief. Apparently, it is the examiner's position that the description of a repeated arch-like pattern of flux distribution through the rotor back iron

lacks support in the original application disclosure. In response, it is submitted that the motor illustration of Fig. 1, considered with the specification description at page 9, provides ample basis for that description. The specification describes permanent magnets as rotor poles that alternate in magnetic polarity along the inner periphery of the annular ring. The back plate comprises magnetically permeable material that serves as a magnetic return path between adjacent permanent magnetic poles. A person of ordinary skill in the art would be aware from this disclosure that flux lines are concentrated in the back iron between adjacent permanent magnets of opposite magnetic polarity. Gaps between adjacent rotor magnets lengthen the circumferential portion of the back iron in which these lines of flux are channeled, as compared with a structure in which adjacent magnets are in contact with each other. Since the lines of flux emanate from one magnetic pole at the surface of the air gap and travel through the back iron to the adjacent magnetic pole at the surface of the air gap, an arch-like pattern is formed, repeatedly around the circumference of the rotor. With these flux paths, flux is concentrated at the magnet surfaces facing the air gap.

The second paragraph of page 5 of the Answer concludes that it would have been obvious to reduce the angular length of the permanent magnets of Heidelberg to create gaps. It is submitted that this rationale begs the question of obviousness. The issue is not whether it would have been obvious to make Heidelberg's magnets smaller if one wanted to form gaps between magnets, but rather whether a person of ordinary skill in the art would have been motivated to form such gaps in the Heidelberg device upon consideration of the teachings of that reference in light of the other applied prior art. As asserted in the Principal Brief, the embodiment of Heidelberg's Fig. 1 (the only rotary

motor fully illustrated) comprises rotor magnets in contact with each other and appropriately dimensioned to interact with the illustrated stator configuration to provide the advantages sought. It is submitted that the artisan would have found no reason to arbitrarily reduce the size of the rotor magnets, thereby sacrificing available flux production as well as disturbing particular stator-rotor structural interrelationships merely to provide seemingly unwanted gaps between the rotor magnets. The Answer has identified a structural configuration in Acquaviva that differs from the Heidelberg structure but lacks a rationale as to why the artisan would have found that structure or a "purpose" of reducing cogging torque to have compelled the propounded modification of the Heidelberg. As asserted in the Principal Brief, Acquaviva attributes improvement in cogging torque to several specific interrelated factors such as stator slot dimensions, distance between rotor elements being significantly greater than the slot dimensions, beveled corners of the rotor elements, etc. Heidelberg reduces "disturbing reactions between adjacent electromagnets" with its own particular structural architecture. The modification proposed in the Answer would result in a structure that is different from either reference, but without any prior art suggestion that such resultant structure would maintain, let alone improve, the particular characteristics of each of the original structures. In summary, it is submitted that the prior art lacks a motivational incentive that would compel a person of ordinary skill in the art to modify the Heidelberg motor structure beyond that disclosed therein.

The Answer relies on Fig. 3 of Heidelberg in combination with Acquaviva for the rejection of claim 6. In this embodiment of Heidelberg, permanent magnets are distributed on the stator, not the rotor. While there are gaps between the magnets, the

gaps are not of uniform dimension, the gaps being the same dimension within groups of magnets and of a different dimension between groups of magnets (column 6, lines 37-43). The rotor electromagnets have constantly changing group members which are all switched over at the same time (column 7, lines 15-17). Modification of this structure to provide uniformly spaced gaps between all permanent magnets would compromise the operation disclosed in Heidelberg, regardless of the teachings of Acquaviva.

Pages 5 through the first paragraph of page 10 of the Answer present claim rejections similar to those stated in the final Office Action. Reference is made to the Principal Brief for appellants' positions with respect to those rejections, which positions are again reiterated.

In paragraph 11 of the Answer, at page 10, emphasis is placed on categorizing all applied references as "being in the same field of endeavor." The Answer identifies a permanent magnet motor as "not a very large field of endeavor." There is no statutory definition of what constitutes a "field of endeavor." The classification of a permanent magnet as a field of endeavor is arbitrary and the conclusion that such field of endeavor is not very large has been made without clear evidentiary support. A search based on the U.S. Classification System (Classes 310 and 318) and an on-line search will yield thousands of U.S. patents that are related to permanent magnet motors and untold numbers of other related publications. If the examiner is of the position that a permanent magnet motor belongs to a narrow field of endeavor and, therefore, is somehow advantageous to a position of obviousness, does the patent to Hancock, which is directed to a reluctance motor - not a permanent magnet motor, fall outside the field of endeavor and therefore not relevant?

Prior art references that are not in the field of endeavor are not likely to have been considered by a person of ordinary skill in the art and, therefore, may not form a viable basis for obviousness. However, that fact that prior art references may be in the same field of endeavor, per se, is not dispositive of issues of obviousness, as long established by legal precedents such as those that have been cited in the Principal Brief. The "field of endeavor" response in the Answer is thus taken as an assertion that it is not inappropriate to consider the teachings of the applied references in evaluating obviousness of the claims. The issues in the present appeal, however, are whether the reference teachings, considered alone or in combination, would have led the artisan to the presently claimed invention. Field of endeavor, per se, does not address these issues.

The bottom portion of page 10 of the Answer points to similarities between Heidelberg and Acquaviva: "both have permanent magnets concentric with the electromagnet stator poles." The Answer, however, ignores differences between the structures and purposes of these patents. For example, the spacing between rotor magnets of Acquaviva in relation to stator slot dimension is significant, as treated in detail in the patent description. The fact that the Heidelberg motor has a salient pole stator rather than a non-salient slotted stator has been ignored in the statement of the rejection. The Answer does not reply to appellants' assertion that such differences would have mitigated against a conclusion of obviousness.

Page 11 of the Answer notes the Li statement that a resolver may be used instead of the Hall IC set disclosed for the particular structure illustrated. This teaching has been relied upon, with respect to the additional requirements of dependent claim 4, to conclude that it would have been obvious to make such substitution in the Heidelberg structure.

The Hall sensors in Hiedelberg are embedded in the stator at an end of each group of electromagnet poles. It is not clear, however, how the Examiner proposes to modify the specific structure disclosed in Heidelberg to incorporate the proposed substitution. Claim 4 is further distinguishable by virtue of its inherent requirements of parent claim 1.

The Answer discusses claims 2 and 12 at page 12. The Answer recognizes that the Hancock motor has a reluctance rotor, not a permanent magnet rotor, and ignores the objective of Heidelberg to reduce the number of stator electromagnet groups that are separately switched by including a large number of stator poles in each group. As a rationale for combining references, the Answer asserts that all the references operate by flux interaction between stator and rotor. Such assertion is not seen to bear significance, as virtually all electric motors require flux interaction between moving and stationary elements. This inherent feature, it is submitted, does not address appellants' assertion that Heidelberg teaches away from a two pole only stator group, thereby mitigating against the proposed reference combination.

With respect to the statements addressing claims 13 through 16 at pages 12 and 13 of the Answer, the positions set forth in the Principal Brief are hereby reiterated. Appellant takes issue with the statement that "it is inherent that the stator pole sections (of Forbes) can be removed and replaced independently . . . for the purpose [of] simplifying the maintenance of the motor." The Answer does not identify where Forbes describes removal of pole sections for maintenance after the motor has been fabricated. The Answer does not respond to the assertion in the Principal Brief that the statement of the rejection does not describe specifically how the Heidelberg structure is to be modified according to the Forbes teachings.

Appellant again submits that 1 through 6 and 11 through 16 stand improperly rejected and urges reversal of the rejection.

Respectfully submitted,

MCDERMOTT, WILL & EMERY

Gene Z. Rubinson
Registration No. 33,351

600 13th Street, N.W.
Washington, DC 20005-3096
(202) 756-8000 GZR:lnm
Facsimile: (202) 756-8087
Date: November 6, 2003